

## REMARKS

Reconsideration and withdrawal of all grounds of rejection are respectfully requested in view of the above amendments and the following remarks.

Claims 1-18, 26 and 35-48 are pending in this application.

### 1. "Functional" claim language:

The Office Action states that certain words in the claims are not given any patentable weight because they are "use limitations" or "sort of product by process limitations." It is believed that a review of the law in this area will show that the current claims use wording that is acceptable and must be given weight in assessing their patentability. The courts have consistently held that there is nothing wrong with using functional words in apparatus claims. "A patent applicant is free to recite features of an apparatus either structurally or functionally." In re Schreiber, 44 USPQ2d (Fed. Cir. 1997). "There is nothing inherently wrong with [defining something by what it does rather than what it is] in drafting patent claims. " See In re Swinehart, 169 USPO 226 (CCPA 1971). Swinehart indicates that if the claimed functional feature in a structural claim is critical in establishing novelty, it must not be inherently possessed by the prior art. Swinehart at 228.

In addition, claim features using "adapted to" followed by a description of how component parts of an apparatus are interrelated, are structural limitations. In the case of In re Venezia, 189 USPO 149 (CAPA 1976), the Court described "adapted to" structural claim language as follows (emphasis added):

"[The claims] precisely define a group of 'kit' of interrelated parts. These interrelated parts may or may not be later assembled to form a completed connector. But what may or may not happen in the future is not a part of the claimed invention. *The claimed invention does include present structural limitations on each part, which structural limitations are defined by how the parts are to be interconnected in the final assembly, if assembled.* However, that is not to say that there is anything futuristic or conditional in the 'kit' of parts itself. For example, paragraph two of claim 31 calls for 'a pair of sleeves'... each sleeve of said pair *adapted to be fitted over the insulating jacket of one of said cables.*'

*Rather than being a mere direction of activities to take place in the future, this language imparts a structural limitation to the sleeve. Each sleeve is so structured or dimensioned that it can be fitted over the existing jacket of a cable. A similar situation exists with respect to the 'adapted to be affixed' and 'adapted to be positioned' limitations."*

See also MPEP 2173.05(g) ("A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used.").

At issue in the Masham case cited in the Office Action was a claim feature reciting how much a mixing apparatus was submerged in a developer material. The developer material of the claim was not one of the component parts of the apparatus. In Masham, the board rejected the claim over a reference that disclosed all of the structural features of the claim except for the feature that described how much the mixing means was submerged in the developer, this being immaterial to the structure of the mixer. That set of facts does not exist here. The present claims do not refer to features other than the components of the display device. As described below, the descriptive features of the "adapted to" clauses in the present claims interrelate the component parts of the display apparatus. In addition, in each case there are other structural limitations that define the presently claimed invention over the prior art. Because no citation was provided in the Office Action for the Fuller case and it was not located, it has not been addressed herein.

The following claim features were improperly ignored in the Office Action as being "intended use" or "sort of product by process features" and will be addressed in turn in view of the legal framework referred to above:

- a) "so as to form an image that is seen by a viewer of the display;"
- b) "said bi-directional circular polarizer circularly polarizes light incident from either of said opposing sides including passing circularly polarized light to said layer of chiral nematic liquid crystal material;"

- c) "being adapted to reflect light received from said bi-directional circular polarizer;"
- d) "that is selectively energizable to emit light said light passing through said translector from said light transmitting side toward said light reflecting side."

Referring to feature a), claim 1 has been amended to recite "drive electronics *adapted to electrically address regions of the cholesteric liquid crystal material effective to cause said cholesteric liquid crystal material to exhibit the focal conic and planar textures resulting in an image.*" It is submitted that this is a proper structural feature in view of the use of the judicially sanctioned "adapted to" wording and its description of the interrelationship of the drive electronics component and the cholesteric liquid crystal layer component. It is submitted that the Office Action is improperly ignoring the wording a) from the claims and comparing the claimed cholesteric liquid crystal layer and its corresponding drive electronics resulting in an image therefrom, to a polarizer that is not electrically addressed to form images. The claims have been amended to delete reference to the image being "seen by a viewer of the display." It is axiomatic that the image from a liquid crystal display is seen by a viewer.

Referring to feature b), all of the claims recite the structural features of a "bi-directional circular polarizer" or "polarizing means" plus function. Hypothetically speaking, if a claim were to recite a "polarizer" or a "circular polarizer," one skilled in the art would understand these to be well known structural components used in optical devices. The presently claimed term "bi-directional circular polarizer," would similarly be understood by one skilled in the art in light of Applicants' specification to be a structural feature. The descriptive language used in addition to this structural feature: "circularly polarizes light incident from either of said opposing sides including passing circularly polarized light to said layer of chiral nematic liquid crystal material," clarifies the structural feature and its relationship with the cholesteric liquid crystal layer. Therefore, it is improper to ignore the wording of b) from the claims.

Regarding feature c), claim 1 recites: “a transreflector having a light reflective side and a light transmitting side, the light reflective side being *adapted to reflect light received from said bi-directional circular polarizer*, said bi-directional circular polarizer being located between said transreflector and said first substrate.” Regarding feature d) claim 1 as amended recites: “a light source *adapted to be selectively energizable to emit light*, said light passing through said transreflector from said light transmitting side toward said light reflecting side.” As discussed above, items c) and d) use “adapted to” clauses followed by wording describing the interrelationship of component parts, and must be treated as structural limitations of the claim under In re Venezia.

The claims have also been amended to clarify that the “chiral nematic liquid crystal material including focal conic and reflective planar textures that are stable in an absence of an electric field,” is known as a “cholesteric liquid crystal material” and that the device is “a bistable, backlit cholesteric liquid crystal display.” The Office Action appears to be improperly equating the previously recited chiral nematic liquid crystal material of Applicants’ claims with the liquid crystal material of a TN or STN liquid crystal display. A TN or STN display is not a bistable cholesteric liquid crystal display and does not include cholesteric liquid crystal material having planar and focal conic textures that are stable in an absence of an electric field and drive electronics that produce an image therefrom, as claimed. Another one of the many differences is that the cholesteric liquid crystal material of a bistable cholesteric liquid crystal display is intrinsically reflective of light, whereas the liquid crystal material of TN or STN display is not.

Claims 6-8, 15-17, 26, 36-38 and 45 have been amended for clarification purposes in view of objections to the claims set forth in the Office Action. Support for the amendments to claims 6 and 15 can be found, for example, on page 19, lines 24-29 of the present specification.

2. Claims 1-5 were rejected under 35 U.S.C. 103 based on the Maeda patent in view of U.S. Patent 5,896,119 to Evanicky.

Applicants' undersigned representative, accompanied by assignee's senior scientist, Dr. Asad Khan, conducted a personal interview with Examiners Rao and Ton on October 25, 2004 during which time Examiner Rao indicated that claim 35 was patentably distinguished from the primary Maeda reference. It is respectfully submitted that the new Evanicky patent reference does not overcome the deficiencies of Maeda and thus, all claims are believed to be patentably distinguished from the applied references. It is submitted that because the primary Maeda reference must fall, so must all of the rejections in the Office Action in that they are all based on Maeda.

As discussed during the interview, Maeda is directed to a much different TN or STN liquid crystal display (identified by item 15 in the Maeda reference). Nowhere in Maeda is the claimed bistable cholesteric liquid crystal display disclosed (i.e., including a cholesteric liquid crystal material having planar and focal conic textures that are stable in an absence of an electric field and drive electronics adapted to electrically address the cholesteric liquid crystal material resulting in an image). A cholesteric liquid crystal material and drive electronics for electrically addressing it to produce an image (e.g., as featured in claim 1) has a definite meaning to one skilled in the art that does not include a polarizer. No motivation is provided in the references to modify Maeda to employ a cholesteric liquid crystal layer and drive electronics for producing an image from the layer. Nor is there any disclosure in Maeda of using a cholesteric liquid crystal layer and its drive electronics, *in combination with* the other claimed elements including a bi-directional circular polarizer, transreflector and light source. Accordingly, the Office Action fails to establish a *prima facie* case of obviousness and thus, all rejections should be withdrawn.

More specifically, with regard to the claimed cholesteric liquid crystal layer, its corresponding drive electronics and the bi-directional circular polarizer, the Office Action is impermissibly picking and choosing from isolated disclosures in the references using Applicants' specification as a roadmap against them. Such hindsight reconstruction of the claimed invention is clearly improper. "When prior art references require selective combination by the court to render obvious a

subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." Interconnect Planning Corporation v. Feil, 227 USPO 543 (CAPA 1985), quoting ACS Hospital Systems, Inc. v. Montefiore Hospital, 221 USPO 929 (Fed. Cir. 1984). In Feil, the Court reasoned that the defendant improperly used hindsight to recreate the invention where "the claims were used as a frame, and individual, marked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention." This hindsight approach was also rejected by W.L. Gore & Assocs. V. Garlock, Inc., 220 USPO 303 (Fed. Cir. 1983). See also Panduit Corp. v. Dennison Manuf. Co., 227 USPO 337 (Fed. Cir. 1985) ("It is not appropriate for the Court to engage in hindsight. Furthermore, it is not appropriate for the Court to pick and choose isolated elements from various prior art references and combine them so as to yield the invention in question when such combining would not have been an obvious thing to do at the time in question.")

The Office Action apparently attempts to overcome the fact that the display of Maeda is a twisted nematic (TN) or super twisted nematic (STN) display, which lacks bistable planar and focal conic textures of a cholesteric liquid crystal display (CHLCD), by arguing that the cholesteric liquid crystal layer of the "polarized light separator" of Maeda is a cholesteric liquid crystal display (e.g., see Fig. 2 in which the polarized light separator 16 comprises a cholesteric liquid crystal layer located between  $1/4 \lambda$  plates). The cholesteric layer of Maeda is a component of the polarized light separator. Maeda does not drive this cholesteric liquid crystal polarizer to form an image. Maeda's TN or STN display is electrically addressed to form images. The Office Action is incorrectly interpreting Applicants' claims and Maeda. Maeda does not disclose or suggest a cholesteric liquid crystal layer and drive electronics for electrically addressing the layer resulting in an image therefrom, as one of ordinary skill in the art would understand these terms. Moreover, Maeda completely fails to disclose the claimed bi-directional circular polarizer.

During the interview, Applicants' undersigned representative and Dr. Khan explained fundamental differences between TN and STN displays and bistable cholesteric liquid crystal displays. Dr. Khan presented a demonstration display (demo) illustrating the operation of one embodiment of the present invention. Dr. Khan showed how a bistable cholesteric display is very optically different than a typical TN display. It was explained that the bistable cholesteric LCD of the present invention includes focal conic and reflective planar textures that are stable in the absence of an electric field. Once portions of the LCD are placed in either texture they remain dark (focal conic) or bright (planar) when the field is removed to maintain the displayed image (i.e., the display is bistable). In contrast, stable focal conic and planar textures do not exist in a TN or STN display. Therefore, Maeda is deficient in that it fails to disclose or render obvious a bistable cholesteric liquid crystal display including a cholesteric liquid crystal layer and drive electronics for applying an electric field to display an image from the cholesteric liquid crystal layer. Moreover, in view of the substantial differences between TN and STN displays and cholesteric liquid crystal displays (CHLCD) in terms of optics, physics and drive electronics, one cannot merely replace the TN or STN liquid crystal display of Maeda with a CHLCD.<sup>1</sup>

The TN or STN LCD device of Maeda requires a "polarized light separator" that directs linearly polarized light to the TN or STN liquid crystal display. This is different than the bi-directional circular polarizer featured in Applicant's claimed invention, which circularly polarizes light that is incident from either side and passes circularly polarized light to the cholesteric liquid crystal display. The Office Action acknowledges this deficiency of Maeda:

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<sup>1</sup> It is not clear if the Office Action is advocating that CHLCD's and Maeda's TN or STN displays are interchangeable. They are not. The applied references do not disclose this nor do they provide support for such a modification. The combined components of the device of Maeda are designed to accommodate the optics, physics and drive electronics of its TN or STN display. In fact, neither Maeda nor Evanicky even discloses a bistable cholesteric liquid crystal display.

"Maeda does not specifically describes an a bi-directional circular polarizer having opposing sides wherein said bi-directional circular polarizer circularly polarizes light incident from either of said opposing sides including passing circularly polarized light to said layer of chiral nematic liquid crystal material."<sup>2</sup>

The Office Action appears to rely on Evanicky to compensate for this deficiency in Maeda:

"However, Evanicky, a patent from the same field of endeavor, describes in figure 9 A etc. and column 12 lines 5 to 20, a bi-directional circular polarizer having opposing sides to provide a LCD a screen having high quality image generation characteristics of a backlight LCD while also being transparent LCD screen."

To the extent this excerpt of the Office Action can be understood, as no reference number of Evanicky's alleged "bidirectional circular polarizer" is given, it is submitted that this reference provides no disclosure of the claimed bi-directional circular polarizer as one of ordinary skill in the art would understand the term in view of Applicants' specification. Figure 9A of Evanicky discloses front and rear polarizers that sandwich an active matrix LCD layer therebetween. Evanicky's LCD is not a bistable cholesteric LCD. The LCD of Evanicky is not a bi-directional circular polarizer and it does not circularly polarize light incident from either of opposing sides including passing circularly polarized light to a layer of cholesteric liquid crystal material, as claimed. It is submitted that one would not replace the polarized light separator of Maeda with Evanicky's entire polarized TN or STN LCD. The references provide no motivation for this modification. Even assuming, *arguendo*, that one would have replaced the polarized light separator of Maeda with the entire display of Evanicky, and that

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<sup>2</sup> The Office Action asserts on page 12 that it is "inherent that when a chiral nematic liquid crystal material is used to convert polarized light to linearly polarized light quarter wave retarders are present" (emphasis added). Applicants believe this inherency argument is improper and is unsupported by any of the applied references. Nevertheless, this argument supports Applicants' position that Maeda's polarizer produces linearly polarized light, not bi-directional circularly polarized light as claimed.

such a device could even work, this still does not satisfy the features of the claimed invention. Evanicky's LCD is not a CHLCD nor is it a bi-directional circular polarizer. In addition, Maeda lacks a bistable CHLCD.

Evanicky's antiglare coating is not a circular polarizer. Therefore, it is irrelevant whether one would use this coating, located on the outside of an active matrix display, on Maeda's polarizer (a linear polarizer comprised of a cholesteric liquid crystal material and  $1/4 \lambda$  plate on an upper or both sides of the cholesteric liquid crystal material. Moreover, the only reason for making such a modification is picking and choosing from the references using impermissible hindsight and Applicants' own invention against them.

In the attached Declaration, Dr. Khan has demonstrated that a TN or STN liquid crystal display does not work according to its intended purpose if modified to employ a bi-directional circular polarizer instead of the linear polarizer used in the TN or STN liquid crystal display or otherwise modified such that circularly polarized light, rather than linearly polarized light, reaches the TN or STN display. Accordingly, the applied references teach away from replacing Maeda's polarized light separator (a linear polarizer) with a bi-directional circular polarizer or otherwise modifying Maeda such that circularly polarized light, rather than linearly polarized light, reaches the TN or STN display, because this would render Maeda's TN or STN device inoperative for its intended purpose.

Even assuming, *arguendo*, that one of ordinary skill in the art would have modified the references in this manner, the applied references do not even disclose a bi-directional circular polarizer. Accordingly, the applied references fail to disclose or suggest the claimed invention. Accordingly, withdrawal of this rejection is respectfully requested.

3. Claims 7-18 and 26 were rejected under 35 U.S.C. §103 over Maeda, Evanicky and further in view of Aso U.S. Patent 5,965,874. Claims 35-43 also

appear to have been rejected under §103 in view of Maeda and Evanicky alone or combined with Aso.<sup>3</sup>

Aso does not remedy the deficiencies of Maeda and Evanicky discussed above, nor do Aso and the other references even remotely disclose or suggest the claimed cholesteric liquid crystal material characterized by the recited S3 Stokes parameter (e.g., see claim 7: "wherein said alignment material is adapted to orient molecules of said cholesteric liquid crystal material effective to enable light reflected from said display to have an S3 stokes parameter greater than 0.75."). Aso is directed to a method for obtaining polarization characteristics of an optical transmission medium. Aso fails to support a *prima facie* case of obviousness of claims 7-18 and 26 in that it provides no disclosure of a cholesteric liquid crystal material characterized by the recited S3 Stokes parameter. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claim 12 and the claims that depend therefrom are patentably distinguished from the applied references because the references do not disclose or suggest, *inter alia*, a backlit bistable cholesteric liquid crystal display comprising:

- a) a cholesteric liquid crystal material and drive electronics for producing an image therefrom;
- c) a first quarter wave retarder;
- d) a second quarter wave retarder;
- e) a linear polarizer located between said first quarter waver retarder and said second quarter wave retarder.

The statements in the Office Action asserting that these features are obvious, are unsupported or based on improper hindsight reconstruction of the invention. The

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<sup>3</sup> Although the basis for a rejection was discussed in the Office Action, no specific rejection of claims 6 and 35-43 was made in the Office Action over a section of the statute. Therefore, the status of claims 6 and 35-43 is unclear. Clarification is requested.

references fail to motivate one skilled in the art to make the modifications proposed in the Office Action and do not result in the claimed invention even if so modified. Accordingly, withdrawal of this rejection is requested.

4. The applied references do not disclose or suggest the features of new claims 47 and 48. The applied references fail to render obvious, *inter alia*, a layer of cholesteric liquid crystal material and electrical addressing means therefor and polarizing means (claim 47). The applied references fail to render obvious, *inter alia*, a layer of cholesteric liquid crystal material and drive electronics therefor and a bi-directional circular polarizer (claim 48).

It is respectfully submitted that the above amendments, taken in conjunction with the foregoing remarks, place all pending claims of this application in condition for allowance. Accordingly, an early Notice of Allowance for this application is respectfully solicited.

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Respectfully submitted,



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